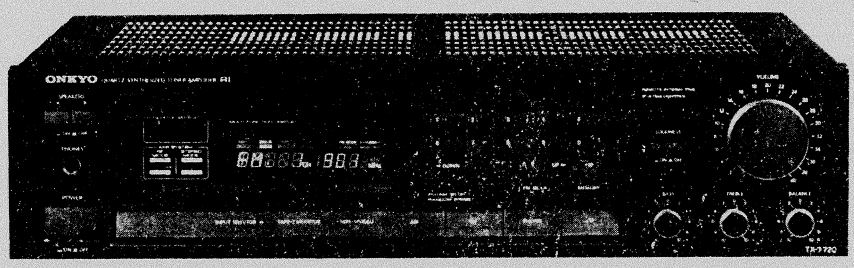
TX-7720

Ref. No. 0M3362

ONKYO SERVICE MANUAL

QUARTZ SYNTHESIZED TUNER AMPLIFIER MODEL TX-7720



Black and Silver models

SAFETY-RELATED COMPONENT WARNING!!
COMPONENTS IDENTIFIED BY MARK ⚠ ON THE SCHEMATIC DIAGRAM AND IN THE PARTS LIST ARE CRITICAL FOR RISK OF FIRE AND ELECTRIC SHOCK. REPLACE THESE COMPONENTS WITH ONKYO PARTS WHOSE PART NUMBERS APPEAR AS SHOWN IN THIS MANUAL.

MAKE LEAKAGE-CURRENT OR RESISTANCE MEASUREMENTS TO DETERMINE THAT EXPOSED PARTS ARE ACCEPTABLY INSULATED FROM THE SUPPLY CIRCUIT BEFORE RETURNING THE APPLIANCE TO THE CUSTOMER.

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ONKYO
AUDIO COMPONENTS

SPECIFICATIONS

AMPLIFIER SECTION

Power output:	40 watts per channel, min, RMS, at 8 ohms, both channels driven, from 40Hz to 20kHz, with no more than 0.3% total harmonic distortion.	
Musical Power Output:	2 × 95 watts at 4 ohms, 1kHz (DIN)	
	2 × 68 watts at 8 ohms, 1kHz (DIN)	
Continuous Power Output:	2 × 50 watts at 4 ohms, 1kHz (DIN)	
	2 × 45 watts at 8 ohms, 1kHz (DIN)	
Total Harmonic Distortion:	0.3% at rated power	
	0.1% at 30 watts output	
IM Distortion:	0.3% at rated power	
	0.1% at 30 watts output	
Damping Factor:	35 at 8 ohms	
Frequency Response:	20 – 30,000Hz ±1dB	
RIAA Diviation:	20 – 20,000Hz ±0.8dB	
Sensitivity and Impedance:	Phono:	2.5mV/50 kohms
	CD:	150mV/50 kohms
	Tape Play:	150mV/50 kohms
	Tape Rec:	150mV/3.5 kohms
Phono Overload (MM):	120mV RMS at 1kHz, 0.3% THD.	
Signal-to-Noise Ratio:	Phono:	85dB (at 10mV input, A weighted)
		75dB (IHF A-202)
	CD/Tape:	95dB (A weighted)
		80dB (IHF A-202)
Tone controls:	Bass:	±10dB at 100Hz
	Treble:	±10dB at 10kHz
Muting	– ∞	

TUNER SECTION

FM:

Tuning Range:	87.50 – 108.00MHz (50kHz steps)	
Usable Sensitivity:	Mono:	12.4dBf, 1.2μV, 75ohms
		1.2μV (S/N 26dB, 40kHz Devi.)
		75ohms DIN
	Stereo:	19.2dBf, 2.5μV, 75ohms
		25μV (S/N 46dB, 40kHz Devi.)
		75ohms DIN
50dB Quieting Sensitivity:	Mono:	18.2dBf, 2.2μV, 75ohms
	Stereo:	38.2dBf, 22μV, 75ohms
Capture Ratio:	1.5dB	
Image Rejection Ratio:	85dB	
IF Rejection Ratio:	90dB	
Signal-to-Noise Ratio:	Mono:	70dB
	Stereo:	65dB
Selectivity:	50dB DIN (±300kHz, 40kHz dev.)	
AM suppression Ratio:	50dB	
Harmonic Distortion:	Mono:	0.15%
	Stereo:	0.30%
Frequency Response:	30 – 15,000Hz ±1.5dB	
Stereo Separation:	40dB at 1kHz	
	30dB at 100 – 10,000Hz	
Muting Level:	17.2dBf, 4μV	

AM:

Tuning Range:	522 – 1611kHz (9kHz steps)
Usable Sensitivity:	30μV
Image Rejection Ratio:	40dB
IF Rejection Ratio:	40dB
Signal-to-Noise Ratio:	40dB
Harmonic Distortion:	0.8%

GENERAL

Dimensions (W × H × D):	435 × 115 × 320mm
	17-1/8" × 4-1/2" × 12-9/16"
Weight:	6.7kg., 14.8lbs.

REMOTE CONTROL TRANSMITTER RC-148S

Transmitter:	Infrared
Signal range:	Approx. 5 meters (16ft.4")
Power supply:	TWO "AA" batteries (1.5V × 2)

Specifications and features are subject to change without notice.

SERVICE PROCEDURES

1.Replacing the fuses

For continued protection against fire hazard,replace only with same type and same rating fuse.

Circuit no.	Part no.	Description
F902	252074	2A-SE-EAK,Primary

2.Changing the band step

With the exception of the models below, a BAND STEP selector switch is not provided.

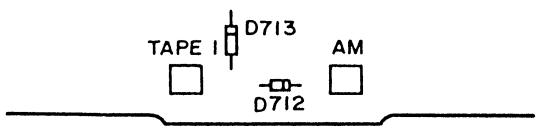
(FM)

MODEL	BAND STEP	D713	R122
UD	100kHz→50kHz	Additional	27kΩ→27kΩ
UG/UQ	50kHz→100kHz	Eliminated	27kΩ→13kΩ

(AM)

BAND STEP	D712
10kHz→9kHz	Additional
9kHz→10kHz	Eliminated

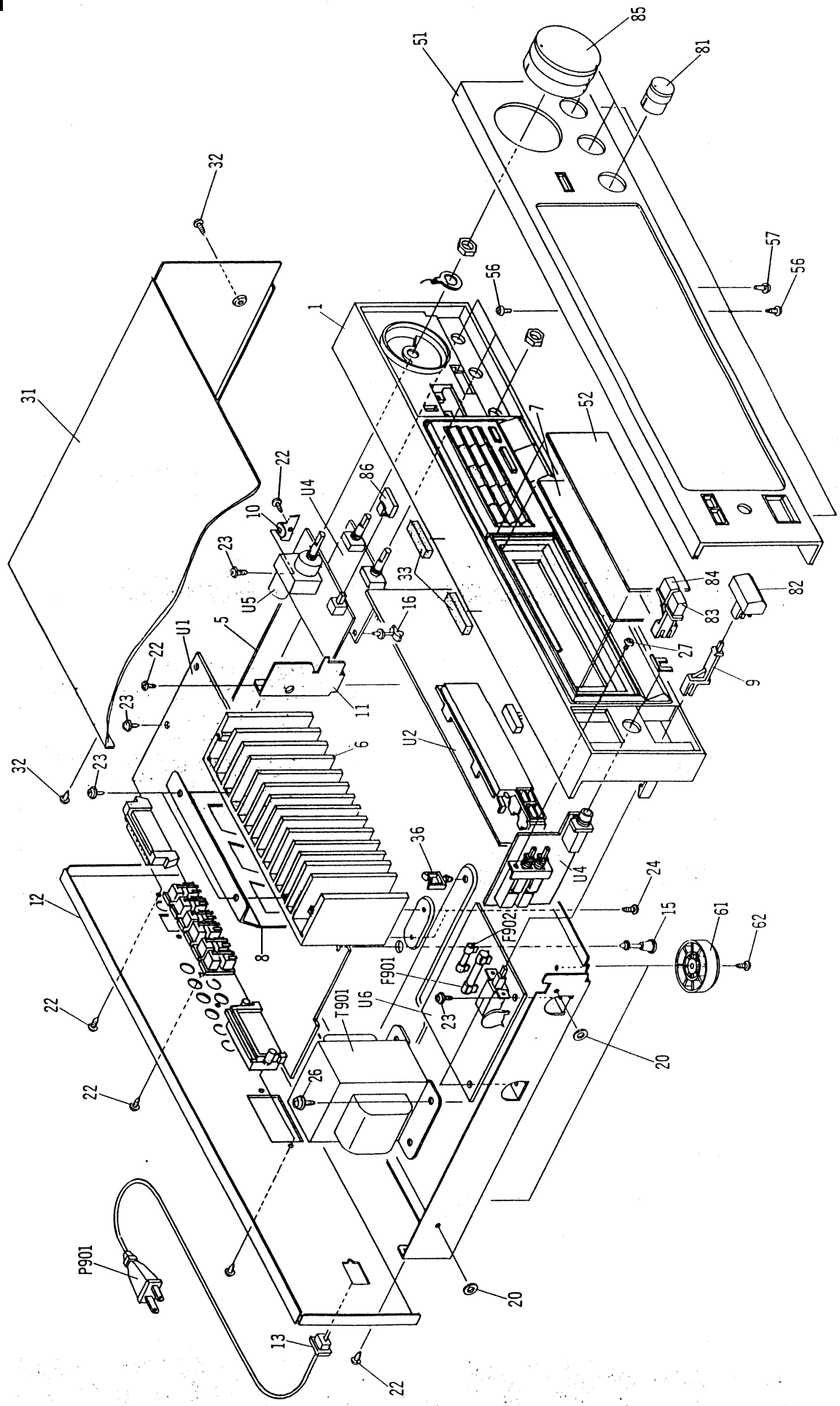
In D712 ISS133 (Part No. 223163) is used. In D713 US1040 (Part No. 223150) is used. R101, with the muting amplitude determined, is on the back panel side of the tuner circuit printed circuit board assembly test points TP-1 and TP-2. (Refer page 13)



3.Memroy preservation

This unit does not require memory preservation batteries. A built-in memory power back-up system preserves contents of the memory during power failures and even when the unit is unplugged. The unit must be plugged in and the power switch turned on and off once in order to charge the back-up system. Note that since this is not a permanent memory,the power switch must be turned on and off a few times each month to keep the back-up system operative. The period of time during which memory contents are preserved after power has last been turned off varies depending on climate and placement of the unit. On the average, memory contents are protected over a period of 3 to 4 weeks (a minimum of 2 weeks) after the last time power has been turned off. This period is shorter when the unit is exposed to very high humidity or used in an area with an extremely humid climate.

EXPLODED VIEW



PARTS LIST

REF. NO.	PART NO.	DESCRIPTION
1	27110540Y	Front bracket ass'y <B>
	27110541Y	Front bracket ass'y <S>
5	27100187BY	Chassis
6	27160210Y	Radiator
7	28133240Y	Back plate
8	27130574Y	Bracket, IC
9	27273116Y	Joint, POWER
10	27141330Y	Bracket, PC
11	27130577Y	Bracket, SHIELD
12	27121316-2Y	Back panel
13	27300750	⚠ Bushing(Strainrelief)
15	27190524	KGLS-14R, Holder
16	27190503	KGLS-8R, Holder
20	27270212	Spacer
22	834430088	3TTS+8B(BC), Tapping screw
23	831130088	3TTW+8B, Tapping screw
26	830440089	4TTC+8C(BC), Tapping screw
27	82143006	3P+6FN(BC), Pan head screw
31	28184432Y	Top cover <B>
	28184431Y	Top cover <S>
32	834430088	3TTS+8B(BC), Tapping screw
33	28140020Y	Cushion
36	27300833	Clamp
51	1A205121	Front panel ass'y <B>
	1A206121	Front panel ass'y <S>
52	28191504Y	Clear plate
56	833430080	3TTP+8P(BC), Tapping screw
57	834430088	3TTS+8B(BC), Tapping screw
61	27175219CY	Leg
62	834430088	3TTS+8B(BC), Tapping screw
81	28323310AY	Knob, TONE <B>
	28323688Y	Knob, TONE <S>
82	28323241-1AY	Knob, POWER <B>
	28323249-1A	Knob, POWER <S>
83	28323314Y	Knob, SPEAKER A <B>
	28323313-2Y	Knob, SPEAKER A <S>
84	28323316Y	Knob, SPEAKER B <B>
	28323315-2Y	Knob, SPEAKER B <S>
85	28323689	Knob, VOLUME <B>
	28323690	Knob, VOLUME <S>
86	28323638Y	Knob, LOUDNESS <B>
	28323637Y	Knob, LOUDNESS <S>
F902	252074	⚠ 2A-SE-EAK, Fuse, primary
P901	253164	⚠ AS-CEE, Power supply cord
T901	2300507Y	⚠ NPT-1028GM, Power transformer

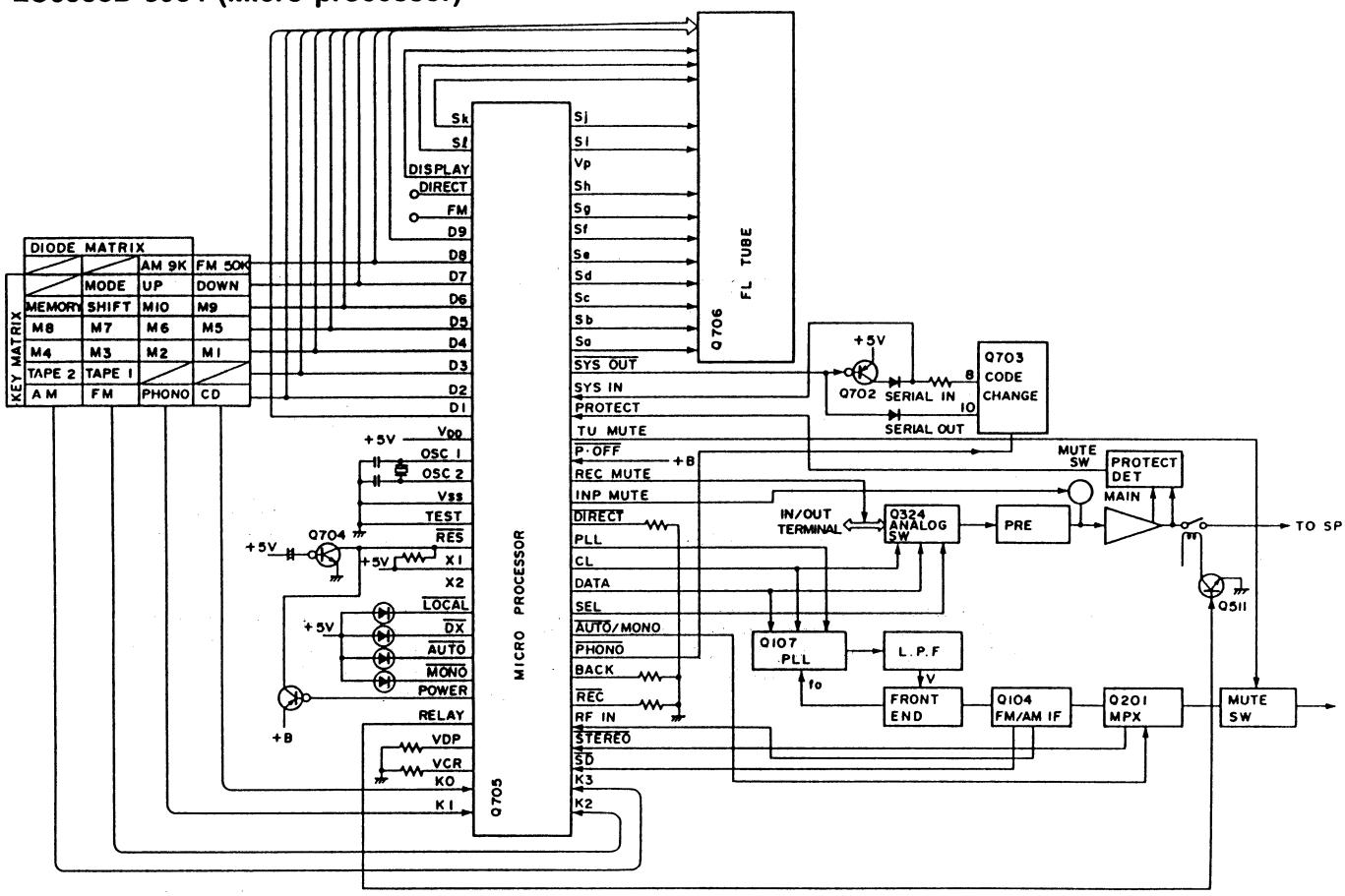
REF. NO.	PART NO.	DESCRIPTION
U1	1A203558-3A	NAAR-3558-3A, Main circuit pc board ass'y
U2	1A203559-3A	NADIS-3559-3A, Display circuit pc board ass'y
U3	1A203560-3A	NAAF-3560-3A, Tone circuit pc board ass'y
U4	1A203561-3A	NASW-3561-3A, Speaker switch pc board ass'y
U5	1A203562-3	NAETC-3562-3, Volume pc board ass'y
U6	1A203563-3A	NAPS-3563-3A, Power supply circuit pc board ass'y

NOTE: <B> : Only Black model
<S> : Only Silver model

NOTE: THE COMPONENTS IDENTIFIED BY MARK ⚠ ARE CRITICAL FOR RISK OF FIRE AND ELECTRIC SHOCK. REPLACE ONLY WITH PART NUMBER SPECIFIED.

IC BLOCK DIAGRAM AND DESCRIPTIONS

Q705
LC6538D-3984 (Micro processor)



Pin No.	Terminal	Descriptions
1 2	Sk Sl	These are the output terminal for segment signal. "H" when active.
3	DISPLAY	This is the display control output terminal. "H" during FL tube lights on.
4	DIRECT	This is the direct indicator output terminal. Not used.
5	FM	This is FM control output terminal. Not used.
6 7 8 9 10 11 12 13 14	D9 D8 D7 D6 D5 D4 D3 D2 D1	These are the output terminal for digit and key scan signal. "H" when active.
15	V_{DD}	This is the device power source terminal. At the time of operation, the supply is 5V. The internal data memory (RAM) is maintained by means of the super capacitor.
16 17	OSC1 OSC2	This is the main system clock connection terminal. Connect to the 4.00MHz ceramic oscillator.
18	V_{SS}	Ground terminal.
19	TEST	This is the test terminal for LSI. Connect to the ground terminal.
20	$\overline{RES}$	This is the reset terminal. Reset at the low level when the power is turned on.
21 22	X1 X2	These are the sub clock input terminal. Not used.
23 24 25 26	$\overline{LOCAL}$ $\overline{DX}$ $\overline{AUTO}$ $\overline{MONO}$	These are the auto reception mode indicator output terminal. "L" when active.

Pin No.	Terminal	Descriptions
27	POWER	This is the power control output terminal. "H" when the power is turned on.
28	RELAY	This is the speaker protection relay control output terminal. "H" when active.
29 30	VDP VCR	These are the video signal control output terminal. Not used.
31 32 33 34	K0 K1 K2 K3	These are the key return signal input terminal. "H" when active.
35	$\overline{SD}$	This is the auto stop input terminal. Auto tuning stops when this terminal becomes low level.
36	$\overline{STEREO}$	This is the input terminal for detection of the stereo broadcast. "L" when stereo broadcast.
37	RF IN	This is IF signal level input terminal. DX mode when this terminal becomes the high level.
38 39	REC BACK	These are the mode setting input terminals.
40	$\overline{PHONO}$	This is PHONO control output terminal. "L" when selector switch is PHONO.
41	$\overline{AUTO/MONO}$	This is AUTO/MONO switching output terminal. "L" when AUTO.
42	SEL	Connect to terminal SEL of analog switch. (Q324 LC7821)
43	DATA	This is the serial data output terminal. Connect to terminal DATA of PLL IC (Q107 LM7001) and terminal DI of analog switch.
44	CLOCK	This is the serial clock output terminal. Connect to terminal CI of PLL IC and terminal DI of analog switch.
45	PLL	Connect to terminal CE of PLL IC.
46	$\overline{DIRECT}$	This is the direct control output terminal. "L" when active.
47	INP MUTE	This is the muting output terminal for audio amplifier. "H" when the selector switch is operated.
48	REC MUTE	This is the muting output terminal for recording. "H" when the selector switch is operated.
49	$\overline{P. OFF}$	This is the input terminal for detection of stoppage of electric current. "L" when the stoppage of electric current.
50	TU MUTE	This is the muting output terminal of tuner section. "H" when active.
51	PROTECT	This is the detection terminal for protection circuit. The speaker relay turns off when this terminal becomes the high level.
52	SYS IN	This is the system code input terminal. "H" when active.
53	$\overline{SYS\ OUT}$	This is the system code output terminal. "L" when active.
54 55 56 57 58 59 60 61	Sa Sb Sc Sd Se Sf Sg Sh	These are the segment output terminal. "H" when active.
62	VP	This is the power supply terminal for pull-down resistor.
63 64	Si Sj	These are the segment output terminal. "H" when active.

Key and diode matrix

	D1(14)	D2(13)	D3(12)	D4(11)	D5(10)	D6(9)	D7(8)	D8(7)	D9(6)
K3(34)		AM	TAPE-2	M4	M8	MEMORY	DIRECT	PSET30	
K2(33)		FM	TAPE-1	M3	M7	SHIFT	FM MODE	EU1/2	
KI(32)		PHONO	VCR	M2	M6	M10	UP	AM9K	VKEY
K0(31)	POWER	CD	VDP	M1	M5	M9	DOWN	FM50K	PKEY
								DIODE MATRIX	

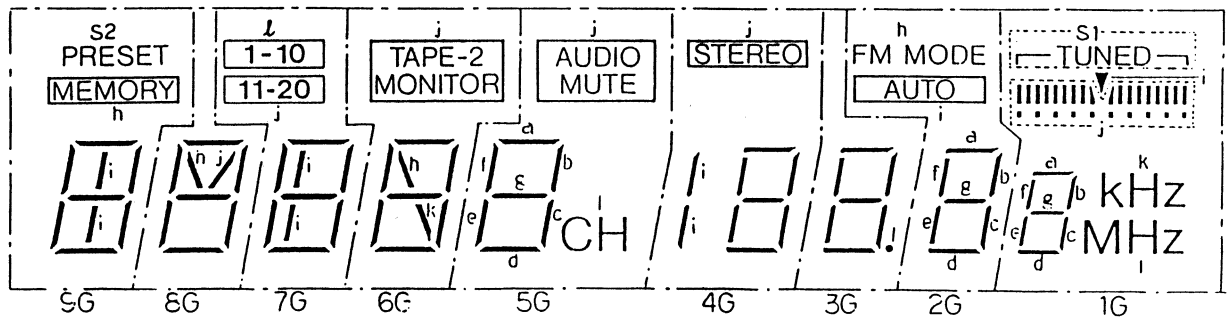
FM50K (FM band setting)

FM50K	Region	Frequency range	Channel space	Reference frequency	IF frequency
1	Europer	87.50 ~108.00MHz	50kHz	25kHz	10.7MHz
0	U.S.A.	87.5 ~108.0MHz	100kHz	25kHz	10.7MHz

AM9K (AM band setting)

AM9K	Region	Frequency range	Channel space	Reference frequency	IF frequency
1	Europer	522 ~ 1611 kHz	9kHz	9kHz	450kHz
0	U.S.A.	530 ~ 1710 kHz	10kHz	10kHz	450kHz

Q706
FIP9BDM8 (FL tube)



Terminal connection

TERMINAL NO.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18		
ELECTRODE	F	F	NP	P (j)	9G	P (i)	8G	P (h)	P (g)	7G	P (f)	NP	6G	P (e)	P (d)	P (c)	5G	P (b)		
TERMINAL NO.			19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36
ELECTRODE			P (a)	NP	4G	P (k)	P (l)	NP	3G	P (s2)	2G	P (s1)	1G	NP	NP	NP	1G	NP	F	F

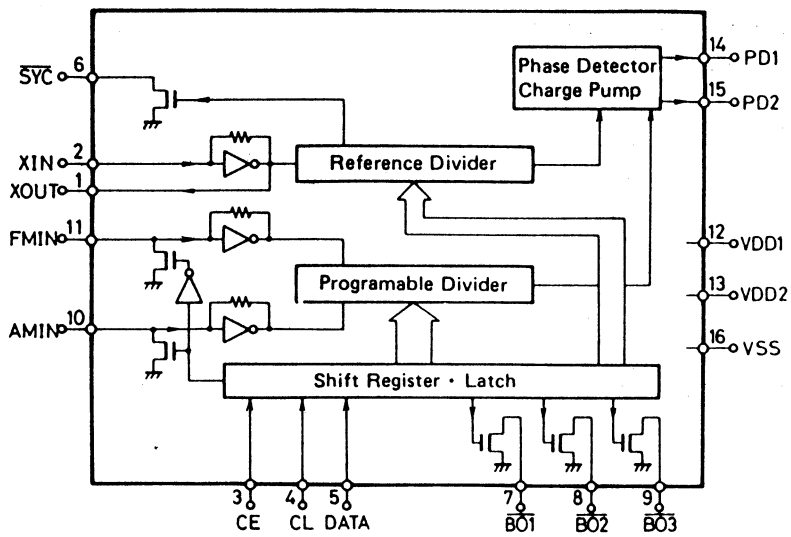
Notes F: Filament NP: No Pin
G: Grid
P: Anode

Connection of fluorescent tube and microporcessor

	D9 (6)	D8 (7)	D7 (8)	D6 (9)	D5 (10)	D4 (11)	D3 (12)	D2 (13)	D1 (14)
Sa (54)	a	a	a	a	a	a	a	a	a
Sb (55)	b	b	b	b	b	b	b	b	b
Sc (56)	c	c	c	c	c	c	c	c	c
Sd (57)	d	d	d	d	d	d	d	d	d
Se (58)	e	e	e	e	e	e	e	e	e
Sf (59)	f	f	f	f	f	f	f	f	f
Sg (60)	g	g	g	g	g	g	g	g	g
Sh (61)	MEMORY	h	h	h				FM MODE	
Si (63)	i	i	i			/		AUTO	▼
Sj (64)	j	j	11-20	TAPE-2	MUTING	STEREO		MONO	IIIII
Sk (1)			k	k	k				kHz
Sl (2)	l		1-10		CH				MHz

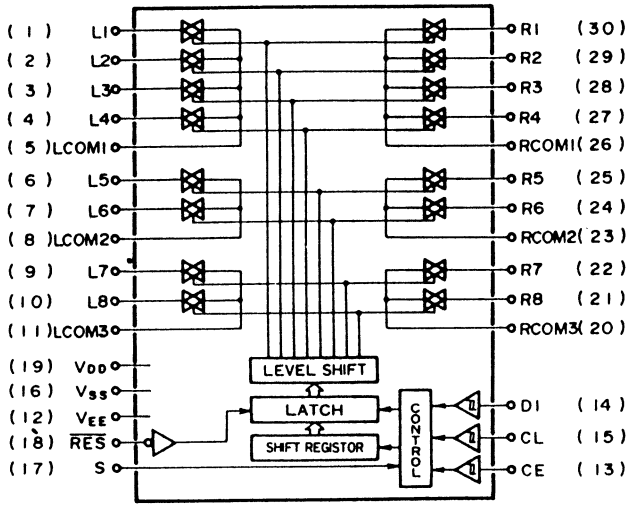
( ): Pin number of micro processor

Q107
LM7001 (PLL synthesizer and controller)



Pin No.	Terminal	Description
1	XOUT	Connect to the 7.2 MHz crystal oscillator.
2	XIN	
3	CE	Chip enable terminal. Connect to the PLL terminal of micro processor.
4	CL	Serial clock input terminal. Connect to the CLOCK terminal of micro processor.
5	DATA	Serial data input terminal. Connect to the DATA terminal of micro processor.
6	$\overline{SYN}$	Not used.
7	$\overline{BO1}$	Not used.
8	$\overline{BO2}$	FM control signal output terminal. "L" when FM.
9	$\overline{BO3}$	AM control signal output terminal. "L" when AM.
10	AMIN	AM local oscillator input terminal.
11	FMIN	FM local oscillator terminal.
12	$V_{DD}1$	Power supply terminal for back-up.
13	$V_{DD}2$	Power supply terminal.
14	PD1	Charge pump output of the phase detector which constitutes the PLL. High level is output when the divided local oscillator frequency is high than the reference frequency. In the opposite case, low level is output. Floating occurs when the frequencies matched. The output is applied to the variable capacitor diode in the local oscillator through the low pass filters.
15	PD2	
16	Vss	Ground terminal.

Q324
LC7821 (Analog switch)



Serial data composition

Switch												
A0	A1	A2	A3	SW 1	2	3	4	5	6	7	8
ADDRESS												
0	1	0	1	CD	PHPNO	TUNER	VDP	TAPE 1 REC	TAPE 1 PB	SOURCE	TAPE 2

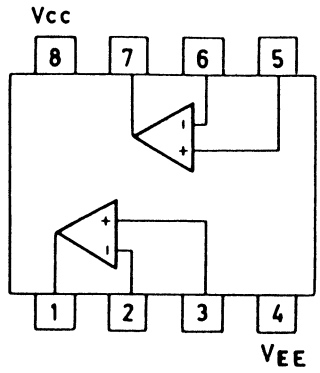
The source becomes ON when the bit of switch becomes the high level.

(Q312)

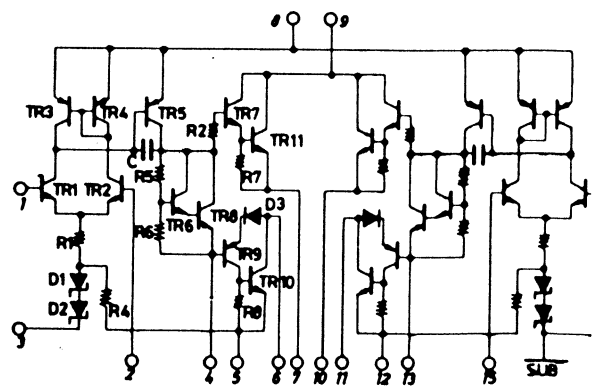
Pin No.	Terminal	Description
1	CD	Input/output terminals of audio signal of right channel. Control to the inside analog switch at the serial data.
2	——	
3	PHONO	
4	TUNER	
5	L COM 1	
6	VDP	
7	VCR PLAY	
8	L COM 2	
9	TAPE 1 PLAY	
10	——	
11	L COM 3	
12	V_{EE}	Negative power supply terminal. (−15V)
13	CE	Chip enable terminal. Connect to SEL terminal of micro processor.
14	DI	Serial data input terminal. Connect to DATA terminal of micro processor.
15	CL	Serial clock input terminal. Connect to CLOCK terminal of micro processor.

Pin No.	Terminal	Description
16	Vss	Ground terminal.
17	S	Selector terminal.
18	RES	Reset terminal. When power is turned ON, the condition of the analog switch is not determined, but when this terminal is "L", all analog switches are OFF.
19	V_{DD}	Power supply terminal. (+15V)
20	R COM 3	Input/output terminals of audio signal of left channel. Control to the inside analog switch at the serial data.
21	——	
22	TAPE 1 PLAY	
23	R COM 2	
24	VCR PLAY	
25	VDP	
26	R COM 1	
27	TUNER	
28	PHONO	
29	——	
30	CD	

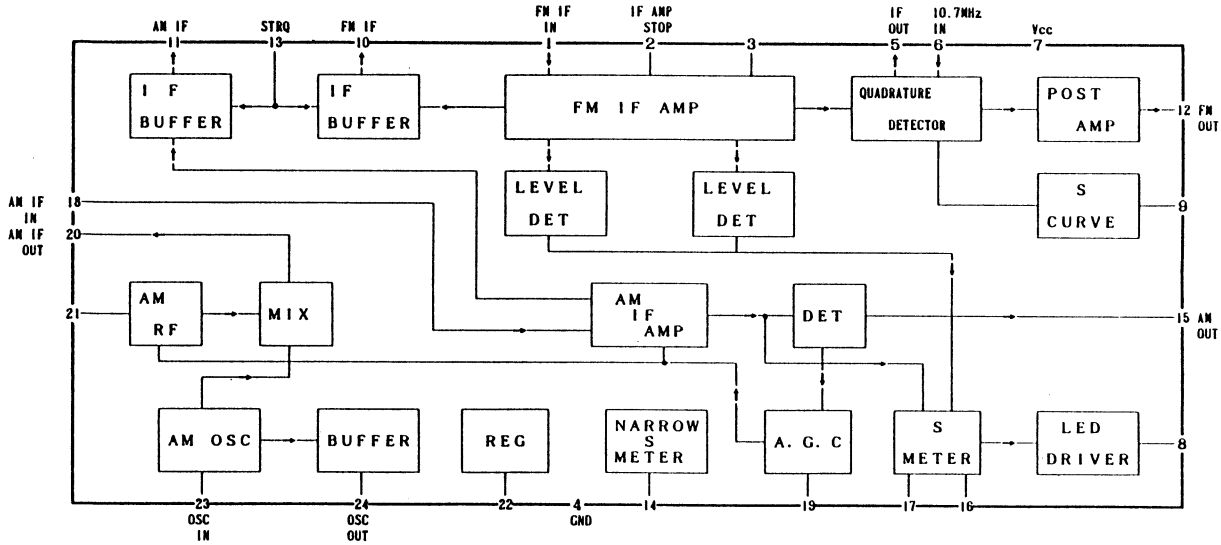
Q301, Q401, Q402
NJM4558D-X (Operation amplifier)



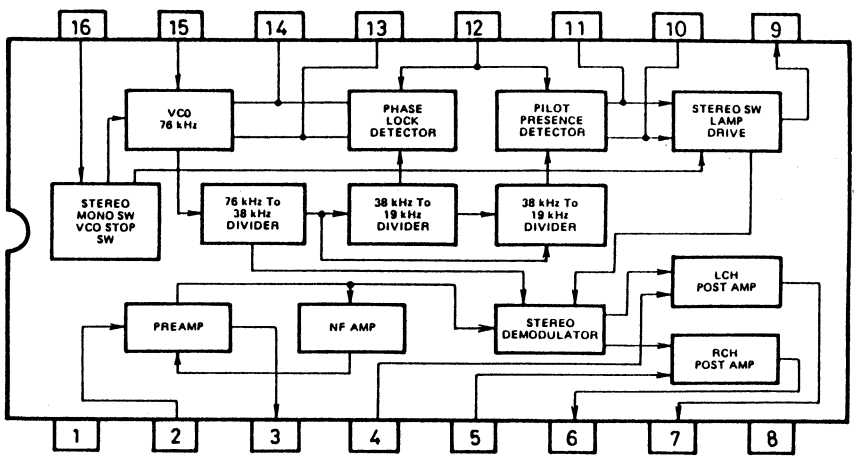
Q501
STK4151V (Power amplifier IC)



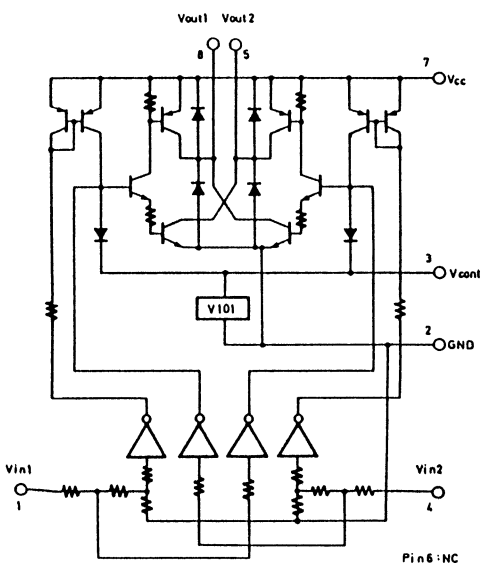
Q104
LA1266 (FM IF & AM radio system)



Q201
AN7470 (Stereo decoder)



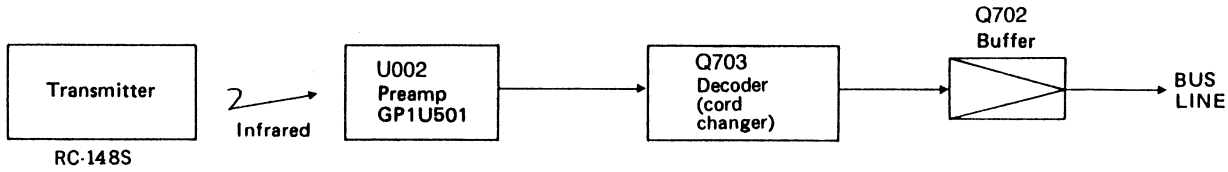
Q403
LB1630 (Motor driver)

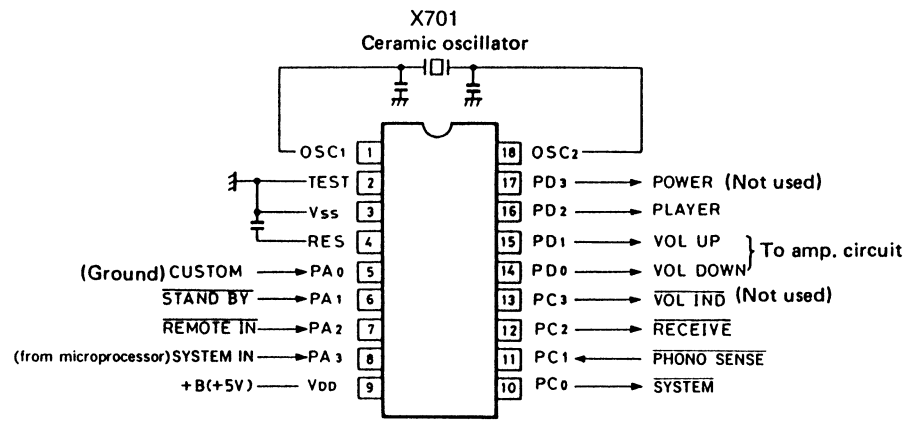


TRUTH TABLE

IN1	IN2	OUT1	OUT2	MOTOR
H	L	H	L	Normal
L	H	L	H	Reverse
H	H	OFF	OFF	Wait
L	L	OFF	OFF	Wait

Q703
LC6527C-3987 (Remote controller)




X701
Ceramic oscillator
OSC1 1
TEST 2
Vss 3
RES 4
(Ground) CUSTOM → PA0 5
STAND BY → PA1 6
REMOTE IN → PA2 7
(from microprocessor) SYSTEM IN → PA3 8
+B(+5V) → VDD 9
18 OSC2
17 PD3 → POWER (Not used)
16 PD2 → PLAYER
15 PD1 → VOL UP
14 PD0 → VOL DOWN
} To amp. circuit
13 PC3 → VOL IND (Not used)
12 PC2 → RECEIVE
11 PC1 ← PHONO SENSE
10 PC0 → SYSTEM

Connection diagram

Terminal No.	Symbol	Terminal	Description
1 18	OSC1 OSC2	OSC	Connect to the 4MHz ceramic oscillator.
2	TEST	TEST	Test terminal. Connect to the ground.
3	Vss	GND	Ground terminal.
4	$\overline{RES}$	$\overline{RES}$	Reset terminal.
5	PA0	CUSTOM	The custom code for decode is selected at this terminal. For this model, the level is low.
6	PA1	$\overline{STANDBY}$	Terminal for STANDBY detection. During low input, only the POWER code is decoded.
7	PA2	$\overline{REMOTE\ IN}$	Signal input terminal from remote control preamp. Active low.
8	PA3	SYSTEM IN	System code input terminal. Active high.
9	V_{DD}	+B(5V)	Power supply terminal.
10	PC0	$\overline{SYSTEM\ OUT}$	Output at this terminal are the custom code remote control code input to REMOTE IN, the system code that has been converted corresponding to the decoded data code.
11	PC1	$\overline{PH\ SENS}$	Phono detection input terminal. Active low.
12	PC2	$\overline{RECEIVE}$	This is the display output for remote control reception. Output is low when decoded code is being received.
13	PC3	$\overline{VOLIND}$	During output of VOLUME UP/DOWN, a pulse (⌐T⌋⌐T⌋⌐T⌋; T=250ms) is output.
14	PD0	VOL DOWN	When the volume DOWN code is input, a high pulse of 120ms is output.
15	PD1	VOL UP	When the volume UP code is input, a high pulse of 120ms is output.
16	PD2	PLAYER	Player control output terminal.
17	PD3	POWER	The power code input inverts the L/H. Level is high for power being tumed ON.

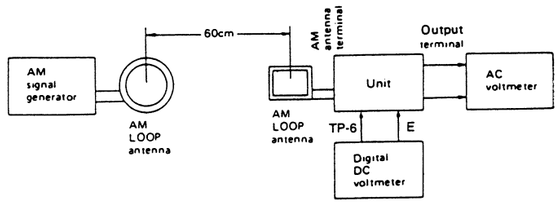
ADJUSTMENT PROCEDURES

FM section

Item	Step	Connection of instrument	FM SG output	Stereo modulator output	Tuned frequency	Output indicator	Adjustment point	Adjust for	Remarks
I F	1	Fig. 1	99.1MHz 1kHz,75kHz devi. 65dBf(60dB)	———	99.1MHz	DC voltmeter	L101	0±20mV	Set the FM mode switch to MONO. Repeat the steps 1 and 2 util no further adjustment in necessary.
	2					Distortion analyzer	L102	Minimum	
V C O		Fig. 2	99.1MHz 1kHz,75kHz devi. 65dBf(60dB)	———	99.1MHz	Frequency counter	R201	19kHz±10Hz	Set the FM mode switch to AUTO.
Stereo distortion		Fig.3	99.1MHz Ext. modulation 65dBf(60dB)	L+R 1kHz 67.5kHz devi.	99.1MHz	Distortion analyzer	IF on front end	Minimum	
Stereo separation	1	Fig.3	99.1MHz Ext. modulation 65dBf(60dB)	Lch. 1kHz	99.1MHz	Rch. AC voltmeter	R202	Minimum	Maximum and same separation
	2			Rch. 1kHz		Lch. AC voltmeter		Minimum	
Tuned indicator level	1	Fig. 3	99.1MHz 1kHz, 75kHz devi. 17.2dBf(12dB)		99.1MHz	TUNED indicator	R101	Light on	
	2		99.1MHz 1kHz, 75kHz devi. 16.2dBf(11dB)					Light off	

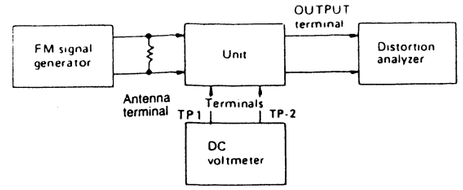
AM section

Step	AM SG output	Tuned Frequency	Output indicator	Adjustment point	Adjust for
1	———	522kHz	Digital DC voltmeter	OSC coil on RF block (L151)	1.5V±0.1V
2	603kHz,60dB/m 400Hz 30% mod.	603kHz	A C voltmeter	RF coil on RF block (L151)	Maximum
3	990kHz, 60dB/m 400Hz 30% mod.	990kHz	A C voltmeter	L152	Maximum

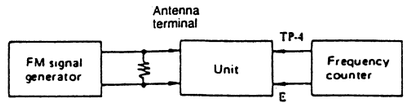


Reference specifications

Tuned voltage	AM	522kHz	1.5 ±0.4V
		1611kHz	7.5 ±0.5V
		87.50MHz	2.0 ±0.5V
		108.0MHz	7.5 ±0.5V
Muting width		35 ± 10kHz	
Muting level		FM 12 ± 3dB	
Auto stop level		AM Less than 72dB/m	
		FM Less than 20dBμ	
Stereo indicator level		14 ± 4dBμ	

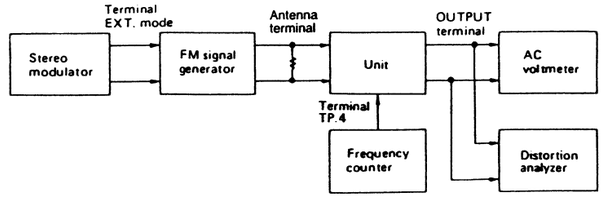


〈Fig. 1〉

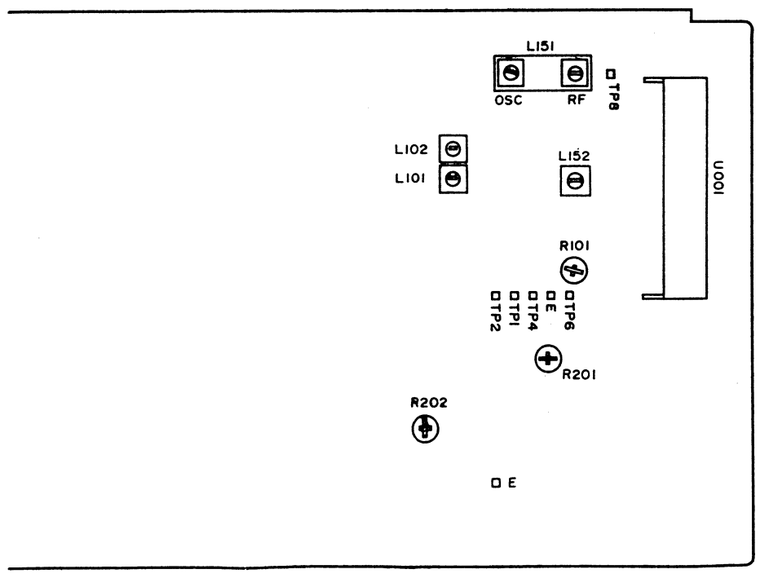


Use the high impedance probe. (10:1)

〈Fig. 2〉

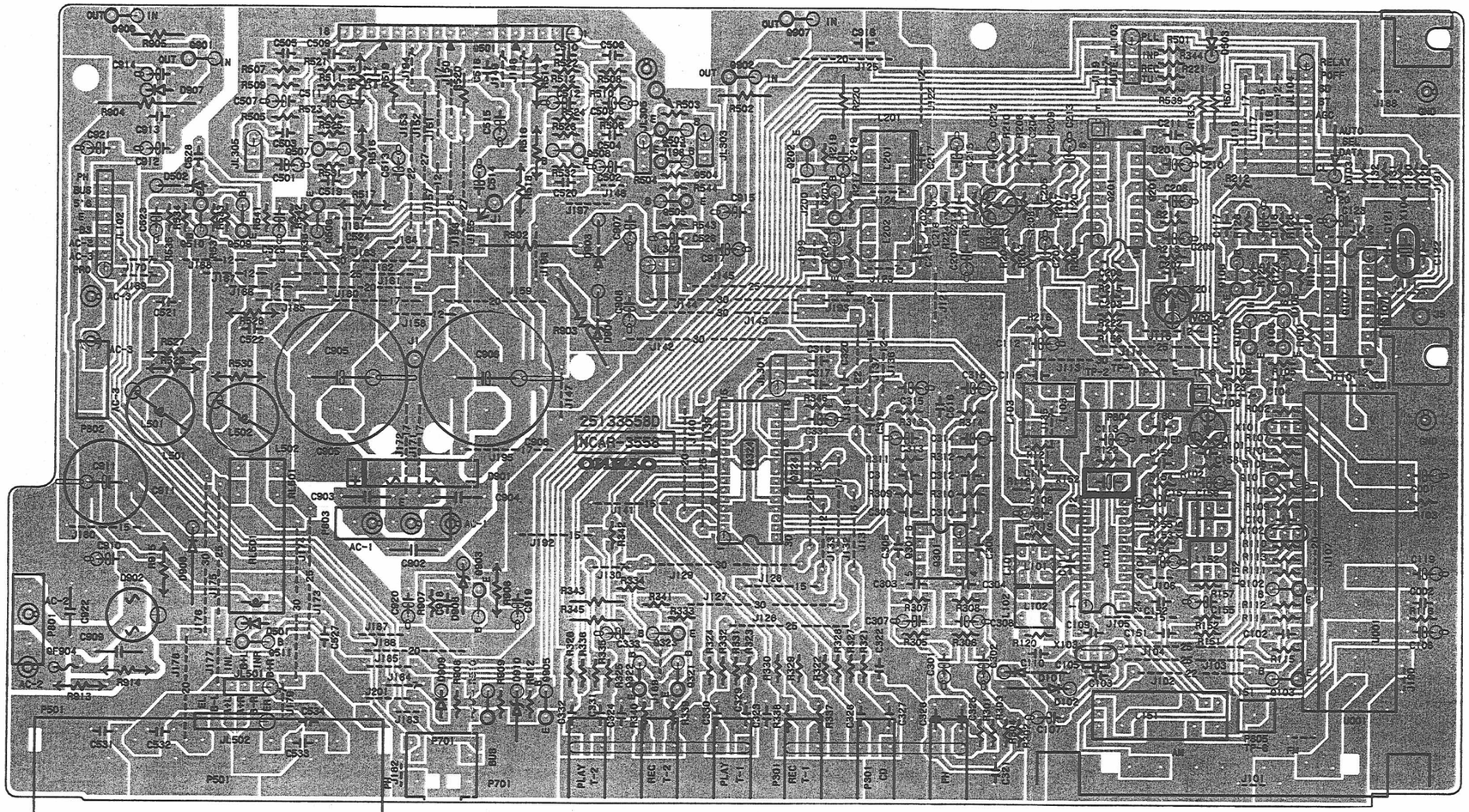


〈Fig.3〉

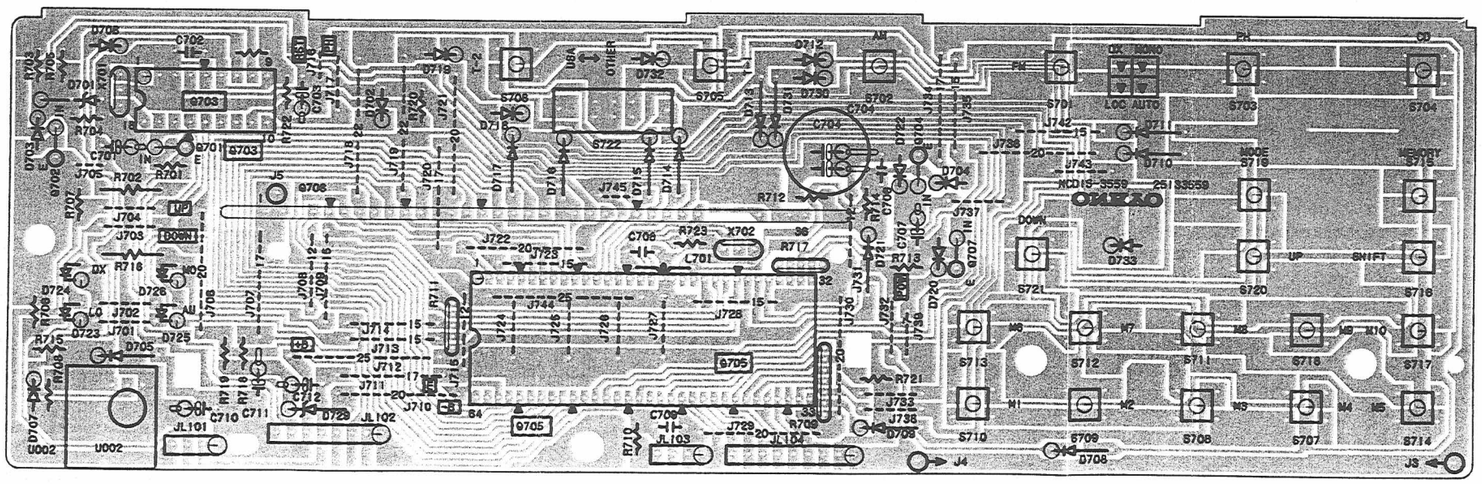


Adjustment point.

PRINTED CIRCUIT BOARD VIEW FROM BOTTOM SIDE



MAIN CIRCUIT PC BOARD

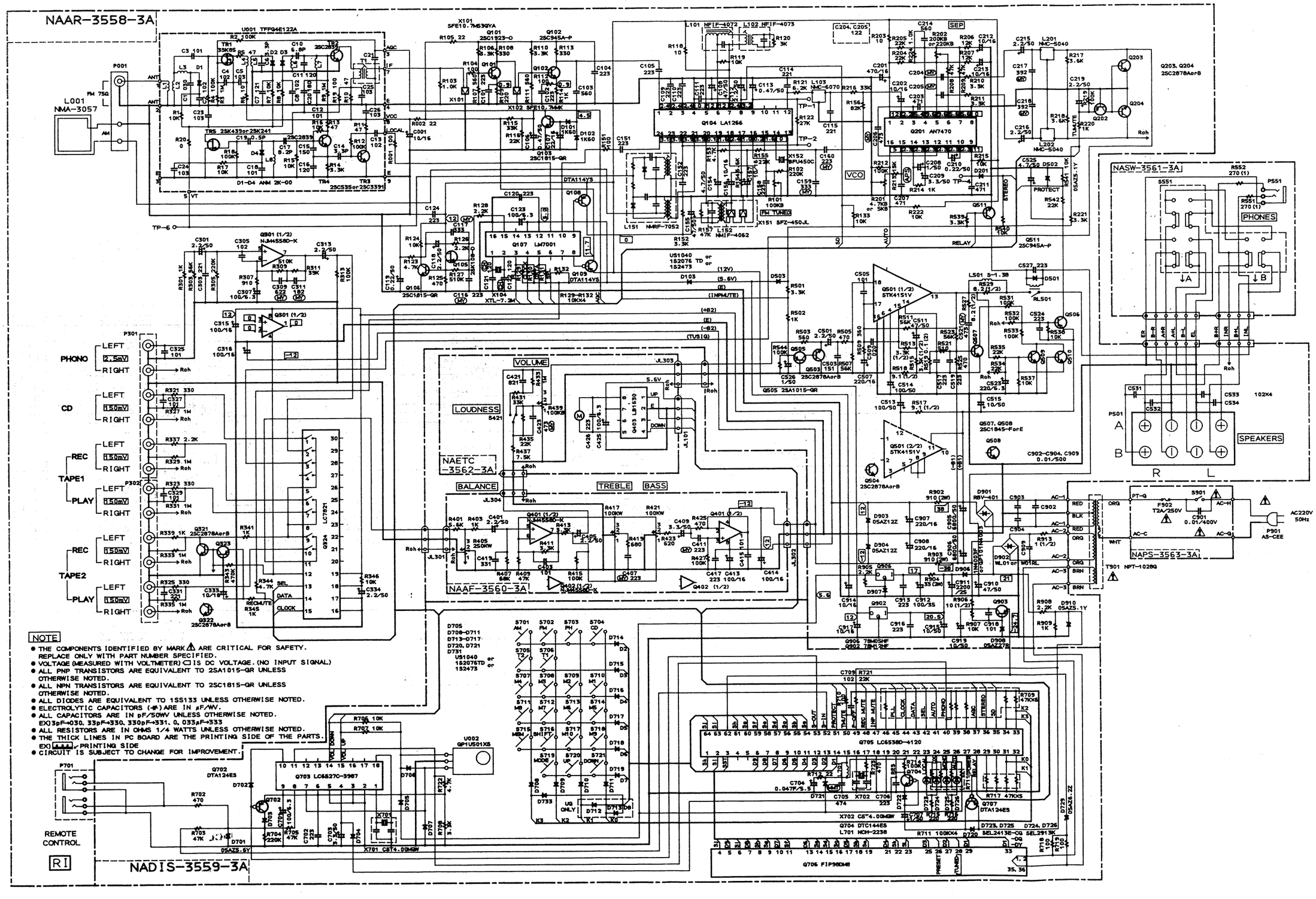


DISPLAY CIRCUIT PC BOARD

SEMI-CONDUCTOR VIEW

LC7821 30 16 1 15 (Top view)	**LC6527C** 18 10 1 9 (Top view)	**DTA124ES** **DTC144ES** MARKING SIDE VIEW E C IN
LA1266 24 13 1 12 (Top view)	**LM7001** **AN7470** 16 15 14 13 12 11 10 9 1 2 3 4 5 6 7 8 (Top view)	**2SA1015** **2SC945A** **2SC1815** **2SC1845** **2SC1923** **2SC2878** E C B
NJM4558D-X **LB1630** 8 5 1 4	**LC6538D** 64 33 1 32 (Top view)	**78M12HF** **78M05HF** IN GND OUT
2SK108 S G D		

SCHEMATIC DIAGRAM



NOTE

- THE COMPONENTS IDENTIFIED BY MARK ⚠ ARE CRITICAL FOR SAFETY. REPLACE ONLY WITH PART NUMBER SPECIFIED.
- VOLTAGE (MEASURED WITH VOLTMETER) □ IS DC VOLTAGE. (NO INPUT SIGNAL)
- ALL PNP TRANSISTORS ARE EQUIVALENT TO 2SA1015-GR UNLESS OTHERWISE NOTED.
- ALL NPN TRANSISTORS ARE EQUIVALENT TO 2SC1815-GR UNLESS OTHERWISE NOTED.
- ALL DIODES ARE EQUIVALENT TO 1SS133 UNLESS OTHERWISE NOTED.
- ELECTROLYTIC CAPACITORS (-#) ARE IN μF/WV.
- ALL CAPACITORS ARE IN pF/50WV UNLESS OTHERWISE NOTED. EX) 3pF→030, 33pF→330, 330pF→331, 0.033μF→333
- ALL RESISTORS ARE IN OHMS 1/4 WATTS UNLESS OTHERWISE NOTED.
- THE THICK LINES IN PC BOARD ARE THE PRINTING SIDE OF THE PARTS. EX) ▬▬ PRINTING SIDE
- CIRCUIT IS SUBJECT TO CHANGE FOR IMPROVEMENT.

PRINTED CIRCUIT BOARD PARTS LIST

MAIN CIRCUIT PC BOARD (NAAR-3558-3A)

CIRCUIT NO.	PART NO.	DESCRIPTION
	Front end	
U001	240085	TFFG4E122A
	ICs	
Q104	22240039	LA1266
Q107	22240090	LM7001
Q201	22240242	AN7470
Q301	222502	NJM4558D-X
Q324	22240079	LC7821
Q501	222044	STK4151V
Q902	222780125	78M12HF
Q906	222780055	78M05HF
	Transistors	
Q101	2211723	2SC1923-O
Q102	2210746	2SC945A-P
Q103	2211255	2SC1815-GR
Q105	2212294	2SK108-D
Q106	2211255	2SC1815-GR
Q108, Q109	2213090	DTA114YS
Q202, Q323	2211455	2SA1015-GR
Q203, Q204	2212285 or	2SC2878-A or
Q321, Q322	2212286	2SC2878-B
Q503, Q504	2212285 or	2SC2878-A or
	2212286	2SC2878-B
Q505, Q506	2211455	2SA1015-GR
Q507, Q508	2211732 or	2SC1845-F or
	2211733	2SC1845-E
Q509, Q510	2211255	2SC1815-GR
Q511	2210746	2SC945A-P
Q903	2211455	2SA1015-GR
	Diodes	
D101, D102	223132	1K60
D103	223150,	US1040,
	223145 or	1S2076TD or
	223124	1S2473
D201, D501	223163	1SS133
D502	224150512	05AZ5.1Y
D503	223163	1SS133
D901	22380023	RBV401
D902	223862 or	WL01 or
	223890	W01RL
D903, D904	224151203	05AZ12Z
D906	223880 or	GP101N4003 or
	223896	1N4003F
D907	223163	1SS133
D908	224152704	05AZ27R
D910	224150512	05AZ5.1Y
	Transformers	
L101	233401	NFIF-4072
L102	233402	NFIF-4073
L152	232139	NMIF-4062
	Coils	
L103	233383	NMC-6070
L201, L202	233294	NMC-5040
L501, L502	231001	S-1.3B
	RF block	
L151	232152	NMRF-7052

CIRCUIT NO.	PART NO.	DESCRIPTION
	Ceramic filters	
X101	3010070	SFE10.7MS3GYA
X102	3010137	SFE10.7MMK
X151	3010123	SFZ450JL
X152	3010076	BFU450C
	X'tal	
X104	3010152Y	XTL-7.2M
	Capacitors	
C001	354741009	10μF, 16V, Elect.
C106	354784799	0.47μF, 50V, Elect.
C107	354742209	22μF, 16V, Elect.
C108	354784709	47μF, 50V, Elect.
C112	354780229	2.2μF, 50V, Elect.
C113	354784799	0.47μF, 50V, Elect.
C116	371122234	0.022μF ±5%, 50V, Mylar
C117	371123334	0.033μF ±5%, 50V, Mylar
C118	354780229	2.2μF, 50V, Elect.
C119	354782299	0.22μF, 50V, Elect.
C123	354721019	100μF, 6.3V, Elect.
C154	354780479	4.7μF, 50V, Elect.
C155	354784709	47μF, 50V, Elect.
C156, C157	354741009	10μF, 16V, Elect.
C159	371123334	0.033μF ±5%, 50V, Mylar
C160	371122234	0.022μF ±5%, 50V, Mylar
C201	354744719	470μF, 16V, Elect.
C202	354741009	10μF, 16V, Elect.
C204, C205	371121224	1200 pF±5%, 50V, Mylar
C206	371124734	0.047μF ±5%, 50V, Mylar
C207	370134714	470pF ±5%, 100V, APS
C208	354780109	1μF, 50V, Elect.
C209	354780339	3.3μF, 50V, Elect.
C210	354782299	0.22μF, 50V, Elect.
C212, C213	354741009	10μF, 16V, Elect.
C215, C216	354780229	2.2μF, 50V, Elect.
C217, C218	371123924	3900pF±5%, 50V, Mylar
C219	354780229	2.2μF, 50V, Elect.
C301, C302	354780229	2.2μF, 50V, Elect.
C307, C308	354721019	100μF, 6.3V, Elect.
C309, C310	371126224	6200pF±5%, 50V, Mylar
C311, C312	371121824	1800pF±5%, 50V, Mylar
C313, C314	354780229	2.2μF, 50V, Elect.
C315, C316	354741019	100μF, 16V, Elect.
C333	354741009	10μF, 16V, Elect.
C334	354780229	2.2μF, 50V, Elect.
C501, C502	354780229	2.2μF, 50V, Elect.
C507, C508	354742219	220μF, 16V, Elect.
C511, C512	354784709	47μF, 50V, Elect.
C513, C514	354781019	100μF, 50V, Elect.
C515	354781009	10μF, 50V, Elect.
C521, C522	371124734	0.047μF ±5%, 50V, Mylar
C523	354722219	220μF, 6.3V, Elect.
C525	354780479	4.7μF, 50V, Elect.
C526	354780109	1μF, 50V, Elect.
C905, C906	3504207	6800μF, 50V, Elect.
C907, C908	354742219	220μF, 16V, Elect.
C910, C912	354784709	47μF, 50V, Elect.
C911	354752229	2200μF, 25V, Elect.
C915, C919	354781009	10μF, 50V, Elect.
C917, C921	354741009	10μF, 16V, Elect.
	Resistors	
R101	5210070 or	N06HR100KBD
	5210221	Semi-fixed
R201	5210062 or	N06HR4.7KBD or
	5210216	N06HR5KBD, Semi-fixed
R202	5210072 or	N06HR220KBD or
	5210222	N06HR200KBD, Semi-fixed
R513-R516	442523324	3.3kohm, 1/2W, Metal oxide film
R517, R518	442520914	9.1ohm, 1/2W, Metal oxide film
R519, R520	4500001	BPR2FK-0.1, Metal plate
R527-R530	442520824	8.2ohm, 1/2W, Metal oxide film
R902, R903	441729114	910ohm, 2W, Metal oxide film
R904	441723304	33ohm, 2W, Metal oxide film
R906	442521004	10ohm, 1/2W, Metal oxide film
R913	442520104	1ohm, 1/2W, Metal oxide film
	Terminals	
P001	25060087	NTM-2PDMN31, Antenna
P501	25060093	NTM-8PDML34, Speaker
P301	25045252	NPJ-6PDBL124
P302	25045213	NPJ-6PDBL92
	Jack	
P701	25045172	HSJ1003-01-020
	Relay	
RL501	25065339	NRL-2P5A-DC24-046

DISPLAY CIRCUIT PC BOARD (NADIS-3559-3A)

CIRCUIT NO.	PART NO.	DESCRIPTION
	Remote control sensor	
U002	24130003	GP1U501XS
	ICs	
Q703	22240243	LC6527C-3987
Q705	22240319	LC6538D-4297
	Transistors	
Q702, Q707	2212600	DTA124ES
Q704	221282	DTC144ES
	FL tube	
Q706	212075	FIP9BDM8
	Diodes	
D701	224150562 or	05AZ5.6Y or
	224450562	MTZ5.6B
D702-D704	223163	1SS133
D705	223150,	US1040,
D708-D711	223145 or	1S2076TD or
D714-D717	223124	1S2473
D712	223163	1SS133
D713	223150,	US1040,
	223145 or	1S2076TD or
	223124	1S2473
D706, D707	223163	1SS133
D718-D720	223163	1SS133
D721	223150,	US1040,
	223145 or	1S2076TD or
	223124	1S2473
D722, D733	223163	1SS133
D729	224150623	05AZ6.2Z
	L.E.Ds	
D723, D725	225137CG,	SEL2413E-CG,
	225137DG or	SEL2413E-DG or
	225137DY	SEL2413E-DY
D724, D726	225142	SEL2913K

CIRCUIT NO.	PART NO.	DESCRIPTION
	OSC elements	
X701, X702	3010150	CST4.00MGW
	Coil	
L701	233400K220 or	NCH-2238 or
	233409K220	NCH-1284
	Capacitors	
C701	354721019	100μF, 6.3V, Elect.
C703	354780339	3.3μF, 50V, Elect.
C704	3000051	0.047F, 5.5V, Super
C707	354780109	1μF, 50V, Elect.
C708	375524744	0.47μF ±5%, 50V, Plastic (MMT)
	Resistors	
R709	49163473406	47kohm×6, 1/10W, Network
R711	49163104404	100kohm ×4, 1/10W, Network
R717	49163473404	47kohm×4, 1/10W, Network
	Switches	
S701-S721	25035548	NPS-111-S510
	Holder	
	27190700	L.E.D

TONE CIRCUIT PC BOARD (NAAF-3560-3A)

CIRCUIT NO.	PART NO.	DESCRIPTION
	ICs	
Q401, Q402	222502	NJM4558D-X
	Capacitors	
C401, C402	354780229	2.2μF, 50V, Elect.
C405, C406	354780229	2.2μF, 50V, Elect.
C407, C408	371122234	0.022μF ±5%, 50V, Mylar
C409, C410	354780339	3.3μF, 50V, Elect.
C411, C412	371122234	0.022μF ±5%, 50V, Mylar
C413, C414	354741019	100μF, 16V, Elect.
	Resistors	
R405	5104225	N11RGL250KWT22Z, Variable, Balance
R417	5104230	N14RLC100KWT22Z, Variable, Treble
R421	5104230	N14RLC100KWT22Z, Variable, Bass
	Socket	
JL304a	25050267	NSCT-3P95

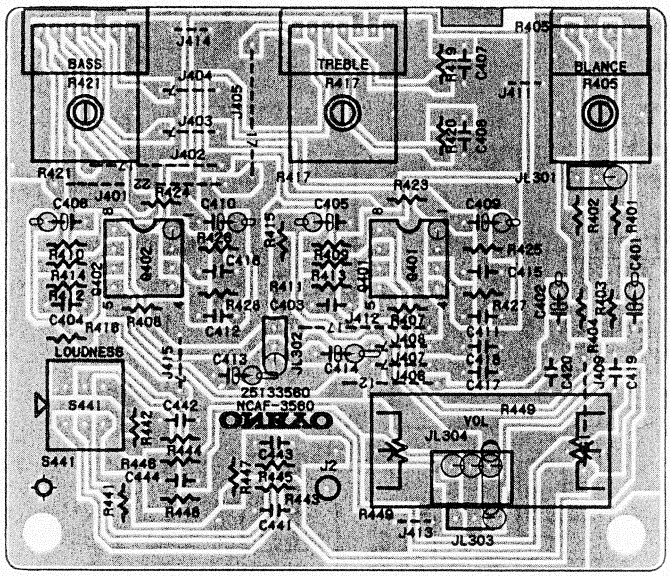
SPEAKER SWITCH PC BOARD (NASW-3561-3A)

CIRCUIT NO.	PART NO.	DESCRIPTION
R551, R552	441622714	270ohm, 1W, Metal oxide film resistors
S551	25035610	NPS-122-142-L572, Speaker switch
P551	25045255	YKB21-5009, Headphone jack

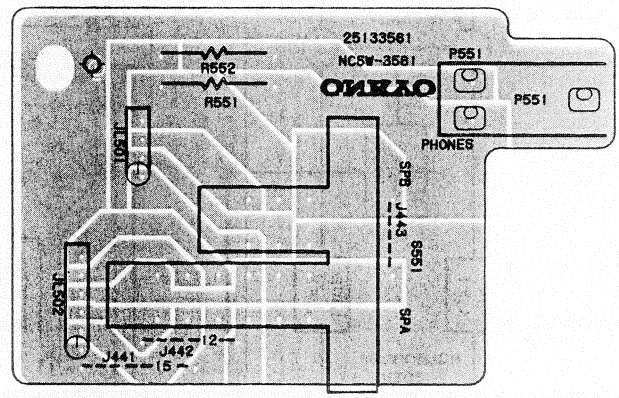
VOLUME PC BOARD (NAETC-3562-3)

CIRCUIT NO.	PART NO.	DESCRIPTION
Q403	222963	LB1630, IC
C423, C424	371124734	0.047μF ±5%, 50V, Mylar capacitors

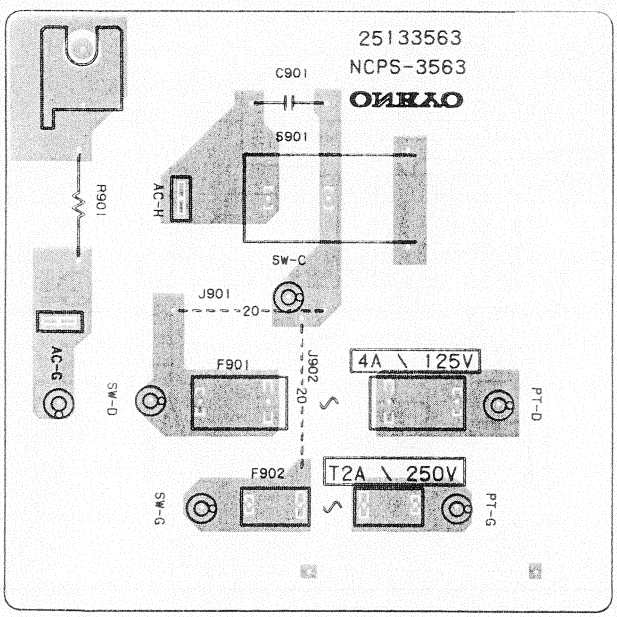
PRINTED CIRCUIT BOARD VIEW FROM BOTTOM SIDE



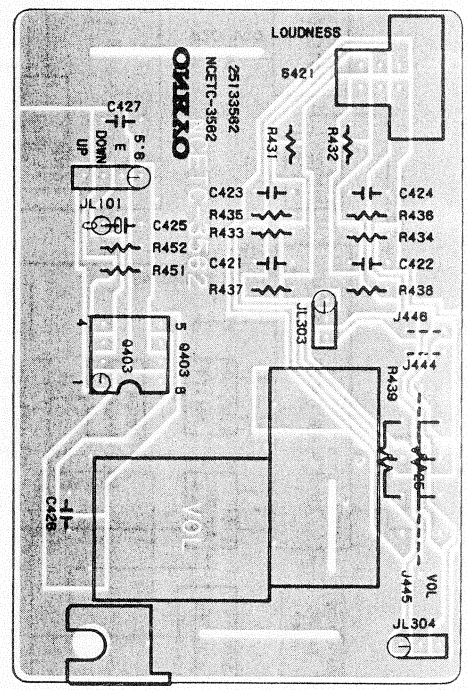
TONE CIRCUIT PC BOARD



SPEAKER SWITCH PC BOARD



POWER SUPPLY PC BOARD



VOLUME PC BOARD

CIRCUIT NO.	PART NO.	DESCRIPTION
C425	354721019	100 μF, 6.3V, Elect. capacitor
R439	5104243	N16RGM100KBTP25F, Variable resistor, Volume
S421	25035609	NPS-122-L571, Push switch, Loudness

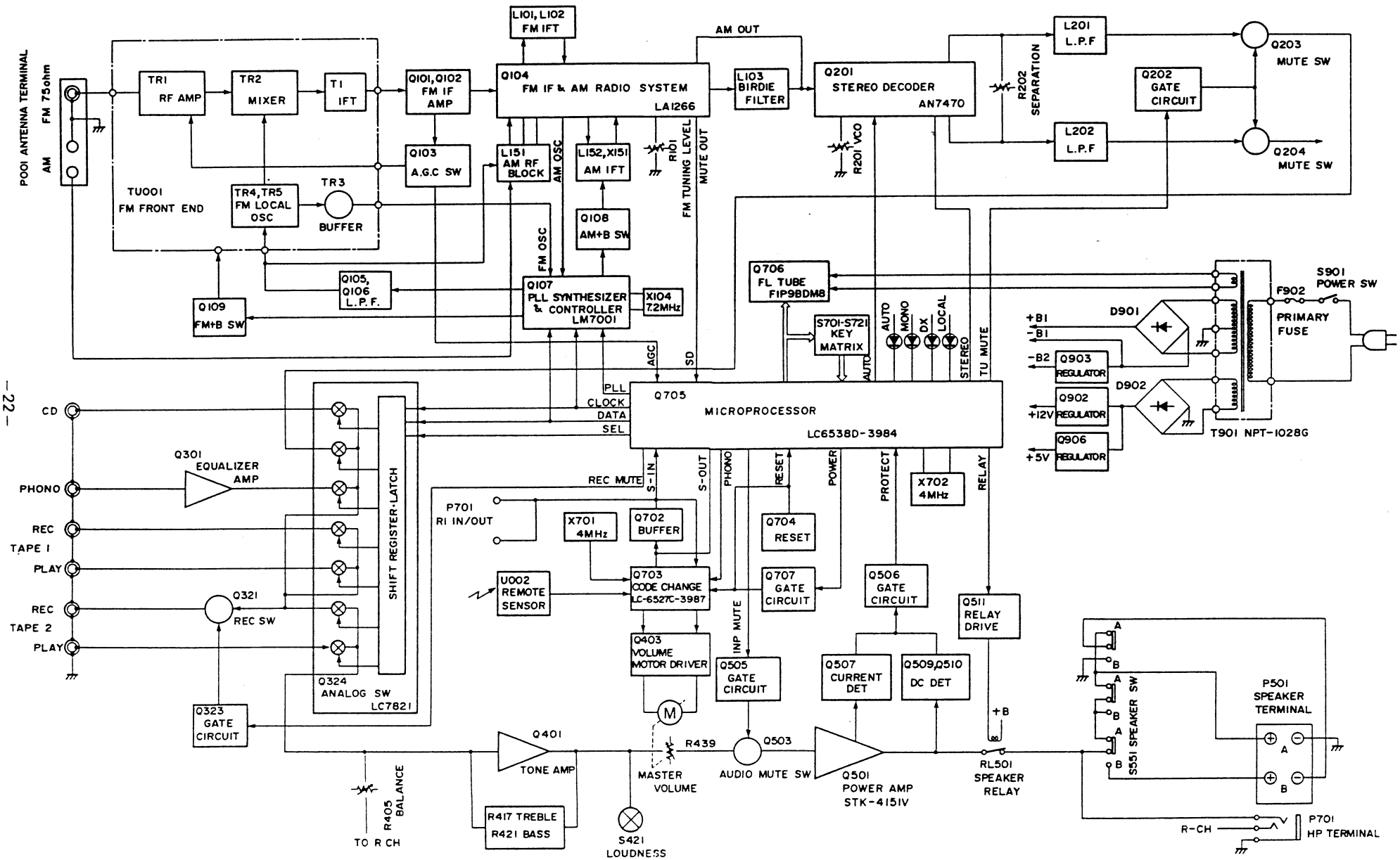
CIRCUIT NO.	PART NO.	DESCRIPTION
S901	25035550	⚠ NPS-111-L512P, Power switch
F902a	25050065	⚠ YSH4037, Fuseholder
F902	252074	⚠ 2A-SE-EAK, Fuse, primary

POWER SUPPLY CIRCUIT PC BOARD (NAPS-3563-3A)

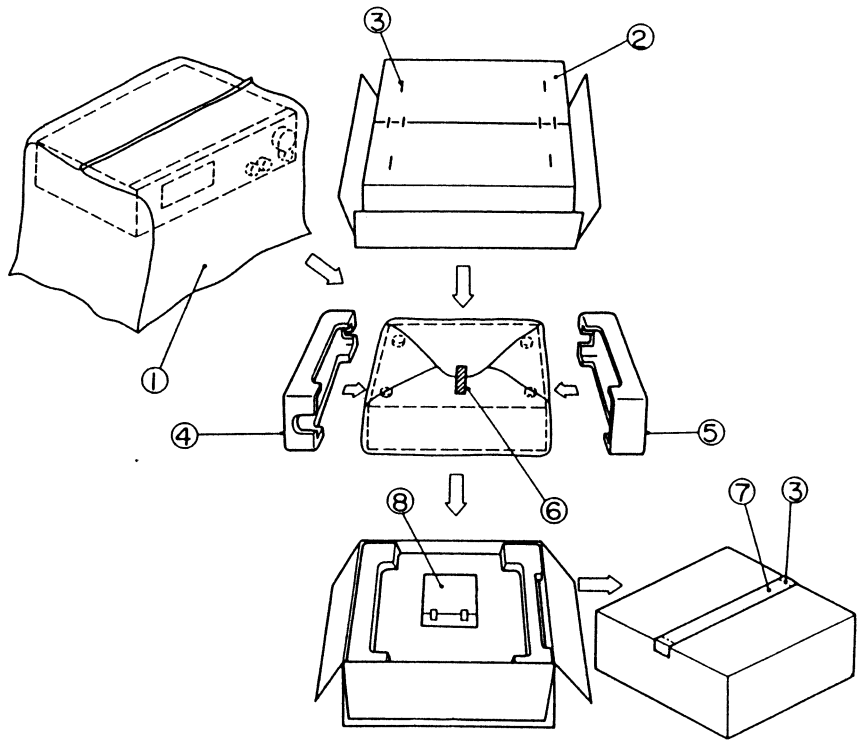
CIRCUIT NO.	PART NO.	DESCRIPTION
C901	3500065A	⚠ DE7150FZ103P AC400V/125V, Capacitor IS
	27301216	⚠ SB1925, Cover for C901

NOTE: THE COMPONENTS IDENTIFIED BY MARK ⚠ ARE CRITICAL FOR RISK OF FIRE AND ELECTRIC SHOCK. REPLACE ONLY WITH PART NUMBERS SPECIFIED.

BLOCK DIAGRAM



PACKING VIEW



REF. NO.	PART NO.	DESCRIPTION
1	29100034AY	850 ×650mm, Poly-vinyl bag
2	29052020Y	Master carton box (Black model)
	29052021Y	Master carton box (Silver model)
3	282301	Sealing hook
4	29091328BY	Pad R
5	29091327BY	Pad L
6	261504	Adhesive tape
7	260012	Damplon tape
8	Accessary bag ass'y	
	29341489Y	Instruction manual
	292092	FM antenna
	232140	NMA-3057, AM loop antenna
	2010169	Connection cord for RI
	3010054	UM-3, Two batteries
	24140148	RC-148S, Remote control transmitter
	29100097	250 ×350mm, Poly-vinyl bag
	29365020A	Warranty card
	29100094A	Poly-vinyl bag